CIVIL AIM CONSULTANTS & ENGINEERS

(Building Geo-Tech & Highway Materials Testing Laboratory)

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 18.07.2022

Aggregate Gradation Test

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	18.07.2022

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	710	7.1	7.10	92.90	90 - 100	
19.00	1236	12.4	19.46	80.54	71 - 95	
13.20	1389	13.9	33.35	66.65	56 - 80	
4.75	2510	25.1	58.45	41.55	38 - 54	
2.36	1068	10.7	69.13	30.87	28 - 42	
0.300	1365	13.7	82.78	17.22	7 - 21	
0.075	1150	11.5	94.28	5.72	2 - 8	

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	685	6.9	6.85	93.15	90 - 100	
19	1425	14.3	21.10	78.90	71 - 95	
13.2	1168	11.7	32.78	67.22	56 - 80	
4.75	2410	24.1	56.88	43.12	38 - 54	
2.360	1165	11.7	68.53	31.47	28 - 42	
0.300	1326	13.3	81.79	18.21	7 - 21	
0.075	1184	11.8	93.63	6.37	2 - 8	

Note:

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For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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JobNo: CACE/BBMP/ML/W.No.14/2022-23 Date : 18.07.2022

TEST RESULTS OF AGGREGATE SHAPE TEST
(Flakiness & Elongation)

Client : Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.

Agency : Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.

Name of work :De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.

BIS Code : IS 2386 Part (1):1963

Date of Test : 18.07.2022

Type of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	12.50	13.50	26.00	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	12.90	13.30	26.20	

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Authorised Signatory

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Job No: CACE/BBMP/ML/W.No.14/2022-23 Date: 18.07.2022

TEST REPORT ON PAVING BITUMEN

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	18.07.2022
Type of Mix	Dense Graded Bituminous Macadam , VG 30
Source of Location	Hot Mix Plant

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	62	Min 45
2	Softening point, 0C	49	Min 47
3	Ductility at 250C, cm	>100	Min40
4	Flash Point, 0C	284	Min 220

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Authorised Signatory

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Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 20.07.2022

Specific Gravity And Water Absorption Test

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	18.07.2022 TO 20.07.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2022	2024	
2	Weight of basket suspended in water	W_2 g	754	754	754	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2017	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	749	749	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.682	2.684	2.685	2.684
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.704	2.709	2.714	2.709
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.35%	0.40%	0.35%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

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For CIVIL AIM CONSULTANTS & ENGINEERS

Sukath. S.C.

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 21.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore..
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	21.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.33	9.84	9 Kn (min)
2	Marshal flow, mm	3.55	3.10	2 – 4
3	Percent air voids in Mineral Aggregate	14.39	13.48	13 – 15
4	Voids in Compacted Mix	4.71	3.78	3 – 6
5	Percent Voids filled with Bitumen	70.78	68.71	65 - 75
6	Density, g/cc	2.24	2.22	--

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 21.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore..
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	21.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.48	10.21	9 Kn (min)
2	Marshal flow, mm	2.63	3.84	2 – 4
3	Percent air voids in Mineral Aggregate	13.92	14.55	13 – 15
4	Voids in Compacted Mix	3.84	4.63	3 – 6
5	Percent Voids filled with Bitumen	68.98	69.71	65 - 75
6	Density, g/cc	2.25	2.27	--

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BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Date of Testing	21.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.50	23.00
7. Bitumen content in %	4.50	4.60
8. Average	4.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	32.9	32.9	6.9	93.1	90 - 100
19	70.8	103.7	21.7	78.3	71 - 95
13.2	66.3	170	35.6	64.4	56 - 80
4.75	82.8	252.8	52.9	47.1	38 - 54
2.360	82.6	335.4	70.2	29.8	28 - 42
0.300	91.8	427.2	89.5	10.5	7 - 21
0.075	25.3	452.5	94.8	5.2	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	34.5	34.5	7.2	92.8	90 - 100
19	73.6	108.1	22.7	77.3	71 - 95
13.2	65.8	173.9	36.5	63.5	56 - 80
4.75	82.90	256.8	53.8	46.2	38 - 54
2.360	76.4	333.2	69.9	30.1	28 - 42
0.300	92.8	426	89.3	10.7	7 - 21
0.075	22.8	448.8	94.1	5.9	2 - 8

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For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
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BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Date of Testing	21.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.00	23.00
7. Bitumen content in %	4.60	4.60
8. Average	4.60	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	33.5	33.5	7.0	93.0	90 - 100
19	71.4	104.9	22.0	78.0	71 - 95
13.2	68.7	173.6	36.4	63.6	56 - 80
4.75	83.4	257	53.9	46.1	38 - 54
2.360	82.1	339.1	71.1	28.9	28 - 42
0.300	94.1	433.2	90.8	9.2	7 - 21
0.075	22.3	455.5	95.5	4.5	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36	36	7.5	92.5	90 - 100
19	74.9	110.9	23.2	76.8	71 - 95
13.2	61.7	172.6	36.2	63.8	56 - 80
4.75	80.70	253.3	53.1	46.9	38 - 54
2.360	75.1	328.4	68.8	31.2	28 - 42
0.300	90.5	418.9	87.8	12.2	7 - 21
0.075	21.5	440.4	92.3	7.7	2 - 8

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Job No.: CACE/BBMP/ML/W.No.14/2022-23

Date: 19.07.2022

Aggregate Impact Value

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	385.5	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86.5	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	296.5	297.5	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.58	22.83	22.71

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date : 19.07.2022

Aggregate Gradation Test

IS : 2386 Part I

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 2386(Part
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	420	8.40	8.40	91.60	90 - 100	
9.5	482	9.64	18.04	81.96	70 - 88	
4.75	638	12.76	30.80	69.20	53 - 71	
2.36	689	13.78	44.58	55.42	42 - 58	
1.18	524	10.48	55.06	44.94	34 - 48	
0.600	546	10.92	65.98	34.02	26 - 38	
0.300	489	9.78	75.76	24.24	18 - 28	
0.150	366	7.32	83.08	16.92	12 - 20	
0.075	482	9.64	92.72	7.28	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	418	8.36	8.36	91.64	90 - 100	
9.5	549	10.98	19.34	80.66	70 - 88	
4.75	682	13.64	32.98	67.02	53 - 71	
2.36	530	10.60	43.58	56.42	42 - 58	
1.18	559	11.18	54.76	45.24	34 - 48	
0.600	546	10.92	65.68	34.32	26 - 38	
0.300	682	13.64	79.32	20.68	18 - 28	
0.150	198	3.96	83.28	16.72	12 - 20	
0.075	485	9.70	92.98	7.02	4 - 10	

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Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Pooma Prana School
Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 19.07.2022

TEST REPORT

Client	:	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
Name of the work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	19.07.2022

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	49	Min 45
2	Softening point, ^{0}C	52	Min. 47
3	Ductility at 27^{0}C, cm	> 100	Min. 40
4	Flash Point, ^{0}C	282	Min. 220

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Job No.: CACE/BBMP/ML/W.No.14/2022-23

Date : 19.07.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.9	12.5	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	12.7	13.3	
	Combined Flakiness & Elongation index	24.60	25.80	

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Job No.: CACE/BBMP/ML/W.No.14/2022-23

Date : 21.07.2022

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022 TO 21.07.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2023	2025	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2018	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	750	750	750	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.679	2.680	2.681	2.680
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.704	2.709	2.714	2.709
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.35%	0.40%	0.45%	0.40%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 22.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	22.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.71	10.52	9 Kn (min)
2	Marshal flow, mm	2.73	3.27	2 – 4
3	Percent air voids in Mineral Aggregate	13.34	14.35	13 – 15
4	Voids in Compacted Mix	3.81	4.73	3 – 6
5	Percent Voids filled with Bitumen	70.13	71.28	65 - 75
6	Density, g/cc	2.22	2.25	--

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 22.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	22.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.84	9.21	9 Kn (min)
2	Marshal flow, mm	3.29	2.95	2 – 4
3	Percent air voids in Mineral Aggregate	13.72	14.15	13 – 15
4	Voids in Compacted Mix	3.91	4.36	3 – 6
5	Percent Voids filled with Bitumen	69.69	70.95	65 - 75
6	Density, g/cc	2.24	2.26	--

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 23.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.65	9.34	9 Kn (min)
2	Marshal flow, mm	3..85	2.78	2 – 4
3	Percent air voids in Mineral Aggregate	14.29	13.45	13 – 15
4	Voids in Compacted Mix	4.37	3.52	3 – 6
5	Percent Voids filled with Bitumen	72.35	70.61	65 - 75
6	Density, g/cc	2.24	2.23	--

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Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date: 23.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.65	9.34	9 Kn (min)
2	Marshal flow, mm	3..85	2.78	2 – 4
3	Percent air voids in Mineral Aggregate	14.29	13.45	13 – 15
4	Voids in Compacted Mix	4.37	3.52	3 – 6
5	Percent Voids filled with Bitumen	72.35	70.61	65 - 75
6	Density, g/cc	2.24	2.23	--

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For CIVIL AIM CONSULTANTS & ENGINEERS
Sukath. S.C.
Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
Ramaiah Layout, Nagasandra, Bangalore - 560 073.
GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	:	**Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.**
Name of the Work	:	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte,BBMP ,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.57	10.15	9 Kn (min)
2	Marshal flow, mm	3.52	3.47	2 – 4
3	Percent air voids in Mineral Aggregate	14.21	14.17	13 – 15
4	Voids in Compacted Mix	4.23	4.95	3 – 6
5	Percent Voids filled with Bitumen	67.39	69.12	65 - 75
6	Density, g/cc	2.22	2.24	--

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
NAME OF THE WORK	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte, BBMP , Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	22.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	470	469
3. Weight of Asphalt and Mineral matter Extracted, g	30	31
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30	31
7. Bitumen content in %	6.00	6.20
8. Average	6.10	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	13.8	13.8	2.9	97.1	90 - 100
9.5	65.8	79.6	16.9	83.1	70 - 88
4.75	90.3	169.9	36.1	63.9	53 - 71
2.36	46.2	216.1	46.0	54.0	42 - 58
1.18	35.8	251.9	53.6	46.4	34 - 48
0.600	55.3	307.2	65.4	34.6	26 - 38
0.300	42.8	350	74.5	25.5	18 - 28
0.150	34.9	384.9	81.9	18.1	12 - 20
0.075	42.8	427.7	91.0	9.0	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	14.9	14.9	3.2	96.8	90 - 100
9.5	66.2	81.1	17.3	82.7	70 - 88
4.75	92.8	173.9	37.1	62.9	53 - 71
2.36	45.3	219.2	46.7	53.3	42 - 58
1.18	48.2	267.4	57.0	43.0	34 - 48
0.600	56.3	323.7	69.0	31.0	26 - 38
0.300	45.8	369.5	78.8	21.2	18 - 28
0.150	37.9	407.4	86.9	13.1	12 - 20
0.075	32.6	440	93.8	6.2	4 - 10

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
NAME OF THE WORK	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte, BBMP , Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	22.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469.5	469
3. Weight of Asphalt and Mineral matter Extracted, g	30.5	31
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30.5	31
7. Bitumen content in %	6.10	6.20
8. Average	6.15	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	12.2	12.2	2.6	97.4	90 - 100
9.5	68.9	81.1	17.3	82.7	70 - 88
4.75	92.6	173.7	37.0	63.0	53 - 71
2.36	42.5	216.2	46.0	54.0	42 - 58
1.18	36.8	253	53.9	46.1	34 - 48
0.600	50.9	303.9	64.7	35.3	26 - 38
0.300	46.3	350.2	74.6	25.4	18 - 28
0.150	35.8	386	82.2	17.8	12 - 20
0.075	46.9	432.9	92.2	7.8	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	14.5	14.5	3.1	96.9	90 - 100
9.5	62.8	77.3	16.5	83.5	70 - 88
4.75	90.9	168.2	35.9	64.1	53 - 71
2.36	46.5	214.7	45.8	54.2	42 - 58
1.18	43.8	258.5	55.1	44.9	34 - 48
0.600	52.4	310.9	66.3	33.7	26 - 38
0.300	49.3	360.2	76.8	23.2	18 - 28
0.150	35.6	395.8	84.4	15.6	12 - 20
0.075	40.8	436.6	93.1	6.9	4 - 10

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CIVIL AIM CONSULTANTS & ENGINEERS

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An ISO 9001-2015 Certified Company

NABL Accredited As Per ISO/IEC 17025:2017 Laboratory

Job No.: CACE/BBMP/ML/W.No.14/2022-23 Date : 23.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri Muniswamappa Lakshminarayana, Contractor, Bangalore.
NAME OF THE WORK	De-silting and Re-setting of drain and Re-asphalting to 3rd main 4th main 7th main road of MEI Layout in Ward No.14,Bagalagunte, BBMP , Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	23.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469.5	470
3. Weight of Asphalt and Mineral matter Extracted, g	30.5	30
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30.5	30
7. Bitumen content in %	6.10	6.00
8. Average	6.05	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	13.9	13.9	3.0	97.0	90 - 100
9.5	65.6	79.5	16.9	83.1	70 - 88
4.75	90.5	170	36.2	63.8	53 - 71
2.36	46.5	216.5	46.1	53.9	42 - 58
1.18	36	252.5	53.8	46.2	34 - 48
0.600	55.9	308.4	65.7	34.3	26 - 38
0.300	43	351.4	74.8	25.2	18 - 28
0.150	35.1	386.5	82.3	17.7	12 - 20
0.075	43.1	429.6	91.5	8.5	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	15.1	15.1	3.2	96.8	90 - 100
9.5	66	81.1	17.3	82.7	70 - 88
4.75	92.6	173.7	37.0	63.0	53 - 71
2.36	45.1	218.8	46.6	53.4	42 - 58
1.18	48.1	266.9	56.8	43.2	34 - 48
0.600	56.1	323	68.7	31.3	26 - 38
0.300	45.6	368.6	78.4	21.6	18 - 28
0.150	38.5	407.1	86.6	13.4	12 - 20
0.075	31.6	438.7	93.3	6.7	4 - 10

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory
- The results indicated above are based on the tests carried out on the samples collected at the site.
- Any Query regarding the report must be reported within 30 days from the date of testing

For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
Ramaiah Layout, Nagasandra, Bangalore - 560 073.
Ph: 9591618639, GSTIN: 29CNWPD9510K1ZB, Email: civilaimconsultants@gmail.com

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5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30.5	30.5
7. Bitumen content in %	6.10	6.10
8. Average	6.10	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	13.1	13.1	2.8	97.2	90 - 100
9.5	69.1	82.2	17.5	82.5	70 - 88
4.75	92.1	174.3	37.1	62.9	53 - 71
2.36	42.2	216.5	46.1	53.9	42 - 58
1.18	37	253.5	54.0	46.0	34 - 48
0.600	51.1	304.6	64.9	35.1	26 - 38
0.300	46.5	351.1	74.8	25.2	18 - 28
0.150	35.1	386.2	82.3	17.7	12 - 20
0.075	47.1	433.3	92.3	7.7	4 - 10

SIEVE SIZE mm	Test 2				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	14.3	14.3	3.0	97.0	90 - 100
9.5	62.5	76.8	16.4	83.6	70 - 88
4.75	91.1	167.9	35.8	64.2	53 - 71
2.36	46.7	214.6	45.7	54.3	42 - 58
1.18	43.5	258.1	55.0	45.0	34 - 48
0.600	52.1	310.2	66.1	33.9	26 - 38
0.300	49.1	359.3	76.5	23.5	18 - 28
0.150	35.2	394.5	84.0	16.0	12 - 20
0.075	40.5	435	92.7	7.3	4 - 10

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